
Alternative Narrowing Process Example

Small Isolated Delta Conveyance Facility

Alternative 3C

Alternatives 3C and 3A are identical except for the type of isolated facility used to convey 5,000 cfs from a diversion on the Sacramento River at Hood to the Clifton Court Forebay. Alternative 3C proposes a pipeline option for the isolated facility, while alternative 3A proposes an open canal.

The objectives of both alternatives are the same. Both alternatives propose new "best feasible technology" fish screens at Hood, North and South Delta Improvements, no new storage, CVP & SWP improvements, similar operational policies and the four common programs.

The differences lie in the details of the isolated facility. Although the alignments of the isolated facilities in both alternatives are the same, the pumping plants, conveyance types, siphons, bridge and utility relations, right-of-way, environmental impacts, and costs differ. These differences are discussed below:

Pumping Plants

Both pumping plants would lift up to 5,000 cfs into the conveyance facility. Alternative 3A would utilize a single low lift (10 feet) pumping plant located within the first two miles of the canal. To overcome the hydraulic head loss in the pipeline conveyance option, alternative 3C requires a pumping plant with lift capability of 150 feet. The increased operating lift would substantially increase operating and energy cost. The annual energy cost for the canal option pumping plant is around \$1 million per year, whereas the pipeline option is around \$12 million per year. Given that the site acreage for the two pumping plants are about the same there would little differences in environmental impacts between the two plants.

Conveyance Types and Environmental Impacts

Alternative 3A proposes a conveyance facility that is an unlined canal resembling the existing channels in the Delta. The 44-mile canal would generally consist of a trapezoidal section with gentle side slopes and a top width of around 340 feet and a depth 27 feet. The pipeline facility in alternative 3C would consist of three side-by-side buried 18 foot inside diameter concrete pipelines. The total distance of the pipeline route is approximately the same as the canal

alignment. The construction activities to bury the pipeline would disturb about half the acreage as the canal. The impacted area in each option would be mitigated on a replacement of in kind land on a 1 to 1 acreage ratio.

Siphons

In order to convey water across rivers and sloughs, the open canal option in alternative 3A would require 11 inverted siphons. The siphons would cross under four major rivers and seven sloughs. The pressurize buried pipeline in alternative 3C would cross under the same waterways. The environmental impacts of these crossings would be similar for both alternatives.

Bridge and Utility Relocations

For the open canal option in alternative 3A, bridges would be constructed over the canal for all county roads, state highways, and railroad crossings. In alternative 3C the pipeline will cross under the same facilities. The construction impacts of the two methods would be similar; however, the elevated bridges across the canal would have more visual impact than the buried pipeline.

Right-of-Way

The right-of-way width for the open canal option would be 1,000 feet for the 44-mile length and would include a total acreage of 5,330 acres. The majority of the disturbed land would be agricultural. Much of the acreage would be used for spoil disposal which could be converted into wildlife habitat. The pipeline option in alternative 3C would require a right-of-way of approximately 2,515 acres of land, about half the acreage required by alternative 3A. The impacted area in each option would be mitigated on a replacement of in kind land on a 1 to 1 acreage ratio.

Costs Comparison

The following table compares the capital cost of the two alternatives. The costs were derived from the references listed in the table and were adjusted to include the mitigation acreage. Each item in the table includes contingencies and engineering, legal, and project administration costs.

Although the table displays a single number for comparison purposes, the costs are preliminary and should be expressed as a range -10% to +25%.

Costs of the canal option are as of March 1997. Where as the cost for the pipeline were estimated

one year earlier in January 1996. The escalation of cost between the two dates has little impact on this comparison.

Isolated Delta Conveyance Facility (5,000 cfs) (\$Millions)		
Cost Item	Canal¹	Pipeline²
Intake Facilities	\$152	\$132
Pumping Plant	46	125
Bridge & Culverts	42	
Canal (includes Right-of-Way Costs)	288	
Siphons	226	
Pipeline (includes Right-of-Way Costs)		1,735
Mitigation (cost adjusted to \$10,000/ac)	53 ³	25 ³
Planning (permitting, EIR/EIS, etc)	50	50
Total Estimated Capital Cost:	\$857	\$2,067

1) CALFED Bay-Delta Program, "DRAFT - Facility Descriptions and Update Cost Estimates for Isolated Delta Convey Facility", March 28, 1997

2) CALFED Bay-Delta Program, "DRAFT - Preliminary Evaluation of 5,000 cfs Isolated Transfer Facility using Buried Pipeline", January 29, 1996

3) Mitigation cost added on a 1:1 replacement ratio for the full right-of-way acreage

These costs show that the pipeline option would cost about two to three times that of the canal. In addition, the pipeline energy requirement is \$11 Million more per year than the canal. Using a three percent discount rate for 30 years would result in a capitalized cost of approximately \$220 Million more for the pipeline option.

Other Considerations

There are a few possible tradeoffs between the two conveyance options. Two of the more significant are:

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- The open canal option offers the potential for recreation and waterfowl habitat areas, whereas wildlife habitat could be established over the top of the buried pipeline option.
 - It would be much easier to increase the capacity of the canal at some future date than to increase the capacity of the pipeline option.

Since the disturbance impacts associated with the canal and pipeline will be mitigated, the preference in the first tradeoff would depend on the point of view of the reader. The second tradeoff can be minimized by a good assurance package for the operation of the facility. These tradeoffs appear to be minor compared to the major cost difference between options.

Recommendation

Given that the alternatives 3A and 3C are identical except for the conveyance method, the environmental impacts of both alternatives can be mitigated so that the difference between the impacts are slight, and the conveyance method in 3C costs 2 to 3 times that of 3A, it is recommended that alternative 3A adequately represents the alternative concept and alternative 3C be dropped from consideration.